the rapidity of the healing of the abscesses, point to a peculiar cause.

The presence of amoebae in sterile pus suggests: (1) That amoebae may play an important part in the production of deep abscesses found in this country. (2) That the pus from such abscesses should as a routine be examined for protozoa, with a view to establishing a causal relationship should such exist.

This case is published by the courtesy of Mr. W. R. Parkinson, F.R.C.S., surgical specialist, Lagos Hospital, Nigeria.

REFERENCES.
¹ Castellani and Chalmers (1919), p. 1836. ² Manson's *Tropical Diseases* (seventh edition), p. 466. ³ Castellani and Chalmers (1919), p. 1828. ⁴ *Journal of the R.A.M.C.*, June, 1924.

THE NATURAL DURATION OF CANCER.

BY

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IN August, 1924, Lazarus-Barlow and Leeming¹ published statistics of the natural duration of cancer, based upon the experience of the Middlesex Hospital. They stated that similar data were being obtained from other hospitals, and the following are the results of an examination of the records of the Cancer Hospital for the years 1900-24. The figures in the two series agree very closely, and it would appear, therefore, that they are in all probability approximately accurate. What deviation there may be from the true value cannot be estimated on account of two errors which, of necessity, enter into the calculation. First, in all cases there is a latent period, of unknown duration and certainly varying from case to case within very wide limits, wherein the developing cancer produces neither symptoms nor signs. Secondly, the date of onset is that stated by the patient, whose memory is not always reliable and observation not always accurate. The former will entail an underestimate of the cancer's duration; the latter may introduce an error in either direction.

The cases dealt with in this paper include only a few sites—namely, rectum, breast, cervix, oesophagus, larynx, thyroid, and neck. The numbers of the first four are sufficient to make them of some value in themselves; those of the last three cannot do so, but may be of service if correlated with the figures from other institutions. In every case the duration is estimated from the reputed date of onset, and in most cases to the known date of death, but in a few instances where the patient left the hospital the length of life after discharge has been estimated by a careful consideration of the general condition of the patient and the extent of the disease when last seen, and I am convinced that no material error is introduced in this way.

None of the cases included received any but palliative treatment, which, as regards the rectum, includes colostomy. The impression gained by watching cases of rectal cancer in which colostomy has been performed is that the operation definitely prolongs life; if this were so the figures in Table II would contain an error accordingly. But when an attempt is made to estimate the increase of life no such increase is discovered (Table I).

TABLE I.—Cases of Rectal Cancer.

	Males.		Females.	
	No. of Cases.	Duration in Months.	No. of Cases.	Duration in Months.
Colostomy...	187	28	132	29
No colostomy ...	69	28	62	29

A number of the cases of cancer of the cervix received applications of radium, and are shown separately in Table II. Although the stomach is one of the organs most frequently affected by cancer, I have not included figures in relation to it because determination of the date of onset

TABLE II.—Duration of Life in Cases which received Palliative Treatment only.

Site and Age.	No. of Cases.	Natural Duration in Months.			Per-centage of Cases below Mean.
		Mean.	Maximum.	Minimum.	
BREAST.					
Under 25	1	72	—	—	—
25-34	28	28	240	5	85
35-44	56	60	372	4	75
45-54	89	31	210	2	70
55-64	68	31	120	3	58
65-74	53	40	144	4	62
75 and over ...	16	30	78	5	70
Total	311	37	372	2	—
RECTUM.					
Under 25	10	36	216	6	80
25-34	29	46	372	6	69
35-44	56	27	156	4	67
45-54	125	28	180	3	62
55-64	136	29	211	2	62
65-74	81	24	90	3	52
75 and over ...	13	26	60	2	54
Total	450	29	372	2	—
OESOPHAGUS.					
Under 25	1	23	—	—	—
25-34	2	45	75	16	50
35-44	24	16	72	2	66
45-54	70	10	38	3	45
55-64	80	9	46	2	43
65-74	28	6	27	3	36
75 and over ...	5	14	40	2	40
Total	210	10	75	2	—
LARYNX.					
25-34	2	8	10	6	50
35-44	6	8	10	3	50
45-54	17	16	62	5	60
55-64	25	14	43	6	52
65-74	2	15	15	13	50
Total	52	14	62	3	—
THYROID.					
Under 25	1 (2)	6 (183)	—	—	—
25-34	—	—	—	—	—
35-44	1	9	—	—	—
45-54	5	16	48	4	60
55-64	2	4	5	3	50
65-74	3	9	27	5	66
75 and over ...	1	3	—	—	—
Total	13 (14)	10 (34)	48	3	—
CERVIX.					
Palliative—					
Under 25	3	15	20	9	66
25-34	29	14	90	4	62
35-44	112	15	78	2	64
45-54	171	16	168	2	59
55-64	86	17	96	2	66
65-74	36	18	108	3	61
75 and over ...	3	12	27	2	66
Total	440	17	168	2	—
Radium—					
Under 25	—	—	—	—	—
25-34	10	38	202	5	80
35-44	22	18	76	7	60
45-54	33	20	66	5	54
55-64	18	22	84	6	78
65-74	10	17	41	5	60
75 and over ...	1	28	—	—	—
Total	94	23	202	5	—
Totals (cervix)—					
Under 25	3	15	20	9	66
25-34	41	20	202	4	63
35-44	139	15	78	2	62
45-54	22	17	168	2	58
55-64	109	18	96	2	69
65-74	46	18	108	3	60
75 and over ...	4	16	27	2	50
Total	554	18	202	2	—
NECK.					
Under 25	1	9	—	—	—
25-34	1	12	—	—	—
35-44	1	48	—	—	—
45-54	7	8	12	4	43
55-64	5	17	36	5	80
65-74	3	20	31	12	30
Total	18	15	36	4	—

is so extremely difficult as to give rise, probably, to great error; because it is commonly treated by gastro-enterostomy, which again in a considerable proportion of cases materially prolongs the life of the patient; and because no great number of such patients actually die in the hospital. Carcinoma of any particular site other than those mentioned

¹ BRITISH MEDICAL JOURNAL, 1924, ii, p. 266.

is relatively infrequent, and the numbers available for analysis so small as not to repay the labour of extraction.

The duration of mammary cancer is markedly longer than that of any other cancer, while that of rectal cancer comes easily second. It is interesting to note that in carcinoma of the cervix radium treatment seems to prolong life by an average of six months, thus confirming the general opinion amongst surgeons that it is of service in these cases. Only five cases of cancer of the breast were treated in this way, but of twenty-eight cases treated by x rays the average duration was only twenty-four months (against thirty-nine months for untreated cases), and each of the age periods showed a corresponding deficit.

The section of the table which deals with the thyroid gland contains, it will be noticed, bracketed figures; these include one case the duration of which was stated to be thirty years. The patient eventually died in the Cancer Hospital and the malignant nature of the growth was proved, but I find it difficult to believe that it was originally malignant, and consider it probable that malignant change ensued in a previously innocent tumour.

The excess of twenty in the total cases of cancer of the cervix over the combined totals treated by palliative measures and by radium is due to the fact that the former number contains twenty cases which received x -ray or combined x -ray and radium treatment.

Although the figures given by Lazarus-Barlow and Leeming lend support to the idea that cancer is more malignant in younger than in older persons, my figures afford no confirmation for such an opinion, and the duration of life appears fairly uniform throughout all the age periods.

For those sites which may be affected in either sex my figures give little, if any, indication that the duration of life is greater in females than in males.

TABLE III.—*Oesophagus, Larynx, Thyroid, Rectum.*

	Males.		Females.	
	No. of Cases.	Duration in Months.	No. of Cases.	Duration in Months.
Oesophagus ...	171	9	36	12
Larynx ...	44	14	8	14
Thyroid ...	4	17	9	8*
Rectum ...	256	28	194	29

* If the case mentioned in the text, and said to have had a duration of thirty years, be included, this figure becomes 43. There was no case in the series of malignant cervical glands in a female.

In conclusion, my thanks are due to Miss Hewer of the Cancer Hospital, by whom was performed the labour of searching the hospital records and abstracting the notes of over 2,000 cases, which form the basis of these statistics.

THE USE OF INTARVIN IN DIABETES MELLITUS.

BY

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THAT the fatty acids are broken down during oxidation by the removal of two terminal carbon atoms at a time (β -oxidation) seems to be fairly well established. Knoop¹ in 1904, in his classical investigations on the fate of the phenyl fatty acids in the animal organism, was the first to propound this theory, which was ridiculed by the pure chemists until Dakin² was able to show that an analogous breakdown of these and similar substances could take place *in vitro*. The investigations here referred to were all concerned with the oxidation of fats with an *even* number of carbon atoms in their molecule. Höckendorf³ had earlier shown that the introduction into the diabetic

organism of alcohols containing an *odd* number of carbon atoms, and which therefore on oxidation probably give rise to fatty acids with an uneven number of carbon atoms, brought about an increased excretion of glucose. Embden and his co-workers⁴ found that on perfusing freshly excised liver with the lower members of the fatty acid series only those containing an *even* number of carbon atoms in their molecule yielded aceto-acetic acid as a result of their katabolism. Then Ringer and Jonas,⁵ working with homologues of propionic acid, showed that valeric and hepatic acids yielded glucose in the diabetic organism roughly in proportion to the amount of propionic acid that would be found as the result of β -oxidation, while butyric and caproic acids led to the increased excretion of aceto-acetic acid without increased glucose elimination. It was then that Ringer conceived the idea of looking for a suitable odd-carbon atom fat to be used in the treatment of acidosis, and which could be given in considerable amounts to diabetics without the possibility or danger of acidosis arising. His attempts, however, to synthesize such a suitable fat were unsuccessful. Other writers—namely, Janeway and Mosenthal—also saw the possibilities. Max Kahn succeeded in synthesizing a suitable fat— $C_{16}H_{33}COOH$, margaric acid—which is easily purified and which, when united with glycerol, forms a neutral fat. This compound, commercially known as intarvin, apparently can be katabolized in the organism without yielding ketogenic derivatives. Kahn states⁶ that on administration to phlorizinized dogs this fat causes a marked increase in glucose elimination in the urine, showing that in the dog it is broken down to propionic acid and then converted into glucose in accordance with the theory brought forward by Ringer and his collaborators. In this communication he brings forward a certain amount of data to confirm his claims of the previous year.⁷ He recommends the use of this fat in those cases where insulin has no apparent or only a moderate effect up to the extent of 1,000 calories daily from such a source. He also gives data from a patient with diabetes complicated by tuberculosis, who was fed with intarvin. In this subject it was found that 100 grams of intarvin given in addition to the ordinary diabetic diet caused no ketonuria, and the carbon dioxide combining power of the blood increased, while the blood sugar during this time remained below the threshold value. In December, 1923, he published⁸ a more extensive series of observations to substantiate his claim.

In his first case, one of starvation acidosis, he found that the addition of 100 grams of intarvin caused the acetone to disappear, while on replacing it the next day with an equal weight of butter the acetone returned once more, to disappear next day on administration of the same quantity of intarvin.

In his second case, showing acetoneuria and acetonæmia even on a low fat diet, the addition of 90 grams of intarvin cleared the acetoneuria, and when an aliquot portion of intarvin was given the next day the acetonæmia also went. The patient's blood sugar also came nearer to a normal level.

In the third case it was found that when the patient had been rendered ketone-free without intarvin, 150 grams of this substance could be added to his diet without ketonuria reappearing, and the bicarbonate reserve of the blood increased while the blood sugar remained normal.

In the fourth case, one of pituitary glycosuria where insulin was ineffectual, feeding with the odd-carbon fat cleared up the acetone and brought about a gain in weight and the glycosuria was controlled. When the intarvin was omitted, ketonuria and glycosuria immediately reappeared.

Joslin⁹ also reports favourably upon this fat. He states:

"It would appear to be ideal in the instance of acidosis in the presence of infection"; and "It can logically be recommended to those cases with whom the fat-carbohydrate ratio is above 3:1."

French workers¹⁰ have also brought forward evidence in favour of the antiketogenic function of intarvin. There are, however, certain dissentients. Sevringhaus¹¹ reports that after comparing the effect of ingestion of beef suet and an equal quantity of glyceryl margarate in a ketonuria following carbohydrate starvation—

"Glyceryl margarate seems to have little or no ketolytic value aside from its glycerol content. It does not exert a protein sparing action in these diets."